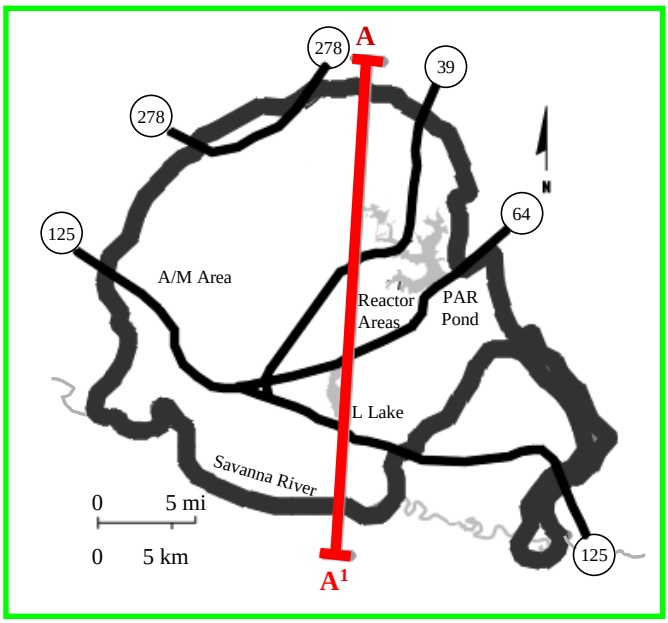
Vadose Zone Fact Sheet
Savannah River Site

Background: The Savannah River Site **(**SRS) is a 800 km^2 (300 mi^2) site located 40 km (25 mi) southeast of Augusta, Georgia in southwestern South Carolina adjacent to the Savannah River. SRS areas and facilities include five inactive nuclear production reactors; an inactive nuclear target and fuel fabrication facility; two chemical separations areas; waste treatment, storage, and disposal facilities; and various administrative, support, and research facilities.



Issues: Due to the high water table, the permeable near surface sediments, and the high annual rainfall, contamination in the vadose zone quickly reaches the ground water.

Vadose zone infiltration: Annual infiltration through the vadose zone to the upper aquifer averages one-third of precipitation, or approximately 42 cm (16.5 in) per year.

Vadose zone characterization/remediation: The remedial action strategies for contaminated surface units at SRS include soil cover, in-situ bioremediation, grout injection/soil mixing, excavation and removal, steam heating, vapor extraction, and air sparging. SRS has recently added five vadose zone vapor extraction/vacuum units in the A/M Area to remove solvent vapors.

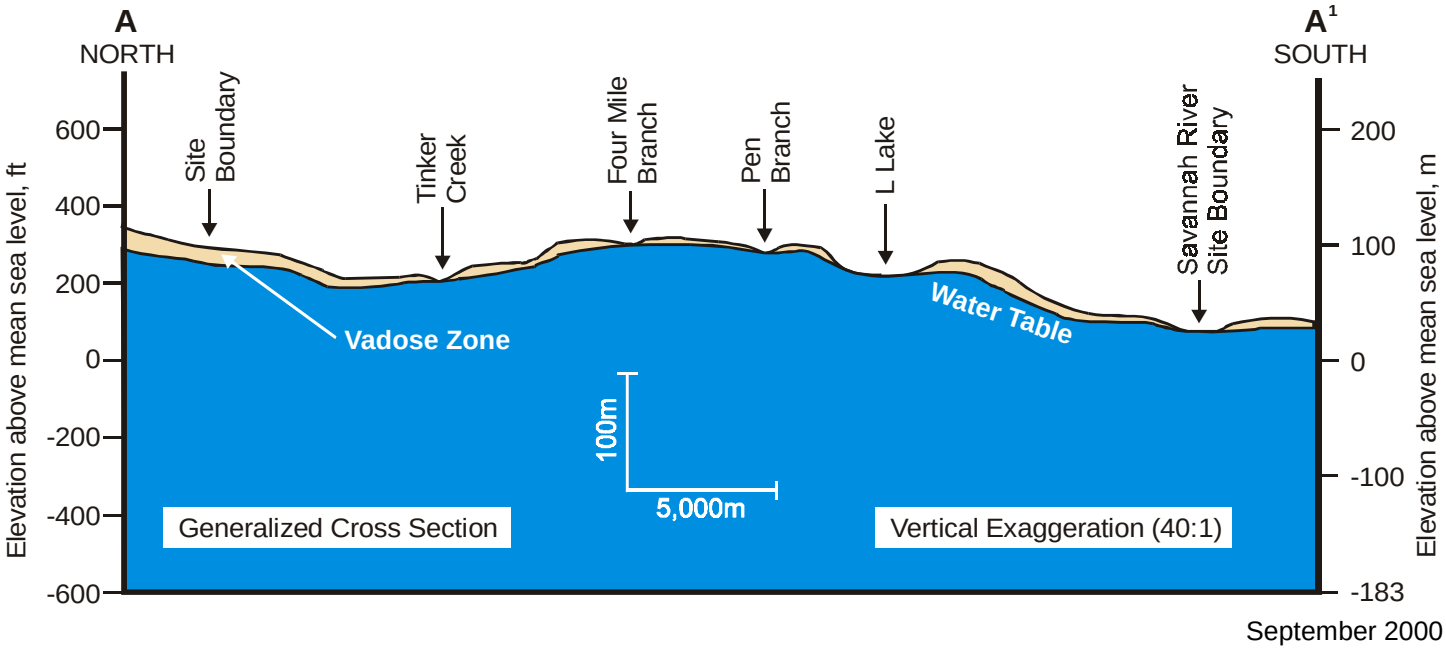
Precipitation: The climate is broadly classified as humid subtropical, with an annual average precipitation of 126 cm (49.5 in).

Surface Water: The Savannah River flows southerly along the western-southwestern boundary of SRS. Five of its major tributaries flow westerly through and drain SRS. There are also numerous ponds and lakes on the site.

Geology: The topography of the area is relatively flat. Unconsolidated and semi-consolidated deposits of sand, silt, clay, and limestone, ranging in thickness from 152 to 427 m (500 to 1,400 ft), underlie SRS. At the base of these sediment deposits are sandstone, claystone, siltstone, metamorphic, and igneous rocks.

Vadose Zone Thickness: The vadose zone ranges from zero to 37 m (120 ft) thick**.**

Major contaminants of concern: Major contaminants include volatile organic compounds, including trichloroethylene and tetrachloroethylene; metals, including aluminum, zinc, arsenic, cadmium, chromium, lithium, mercury, lead; and radionuclides, including strontium-90, cesium-137, cesium-139, cobalt-60, uranium, plutonium-238, plutonium-239, and tritium.

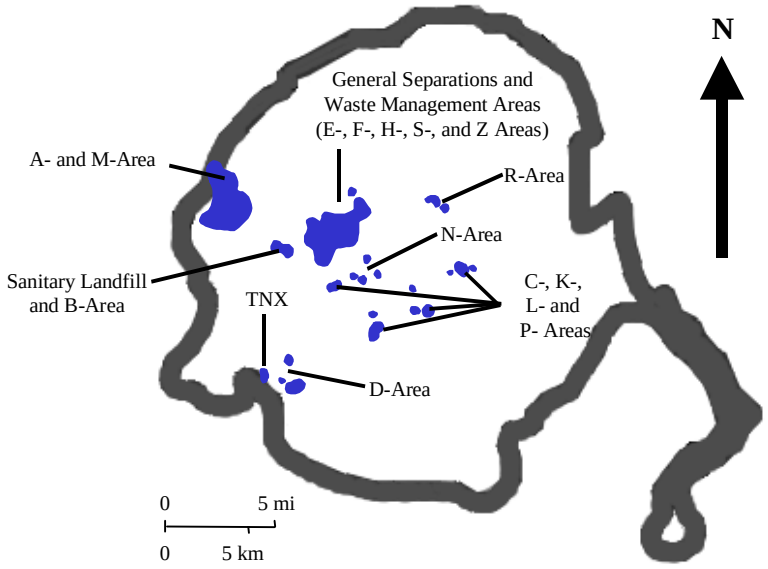


September 2000

Ground Water Fact Sheet
Savannah River Site

Background: The Savannah River Site **(**SRS) is a 800 km^2 (300 mi^2) site located 40 km (25 mi) southeast of Augusta, Georgia in southwestern South Carolina adjacent to the Savannah River. SRS areas and facilities include five inactive nuclear production reactors; an inactive nuclear target and fuel fabrication facility; two chemical separations areas; waste treatment, storage, and disposal facilities; and various administrative, support, and research facilities.

Hydrogeology: All of the ground water beneath SRS exists as part of a large hydrogeologic system of interconnected aquifers and surface streams. In the humid environment of the southeastern United States, recharge to the shallow aquifer system is through rainfall. Ground water moves underground from recharge areas to deeper aquifers and discharge areas (pumping wells, wetlands, and surface streams). Most ground water contamination at SRS occurs within several major plumes. Plumes are intermingled as a result of multiple hazardous substance releases.



Ground Water Contamination Exceeding Drinking Water Standards

Issues: There is currently no treatment technology for tritium in the ground water and there are multiple contaminant sources. Phytoremediation is currently being considered for tritium "management."

Ground water characterization/remediation: Primary remediation goals are to: 1) eliminate new ground water contamination by minimizing the amount of contamination that enters the ground water by restricting contact of rainwater with wastes and contaminated soils by removing the wastes, capping the waste sites, or providing in situ stabilization of the wastes; 2) protect underground drinking water sources through hydraulic control and water treatment programs; 3) protect surface waters by minimizing discharges of contaminants, and 4) conduct remediation by addressing individual release sites and intermingled plumes in a comprehensive approach. As a general rule, ground water resources will be restored for beneficial re-use to the extent practicable. If complete ground water restoration is not practicable, SRS will prevent exposure to contaminated ground water through institutional controls. Over twenty plumes have been identified.

Ground water use: Industrial/potable water.

Primary Contaminants	Depth	Remedial Approaches
Trichloroethylene (TCE); tetrachloroethylene (PCE); tritium; vinyl chloride; strontium-90; metals and various radionuclides	Predominantly 0 to 24 m (80 ft), but up to 122 m (400 ft)	Air sparging; soil vapor extraction; steam heating; in-situ oxidation; in-situ recirculation wells; phytoremediation; pump and treat; re-injection; constructed wetlands; pH adjustment; monitored natural attenuation; mixing zone; tritium discharges via irrigation; enhanced in-situ bioremediation